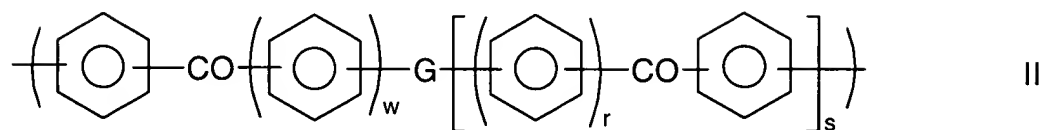


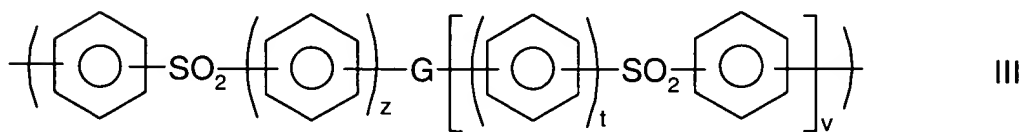
and/or a moiety of formula



and/or a moiety of formula

wherein at least some of the units I, II, and/or III are sulphonated;

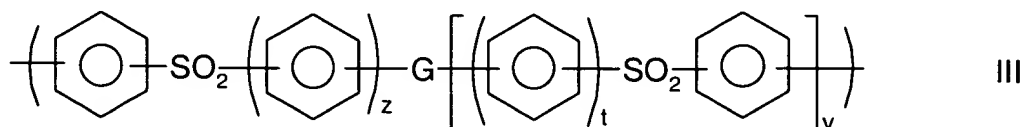
wherein the phenyl moieties in units I, II and III are independently optionally



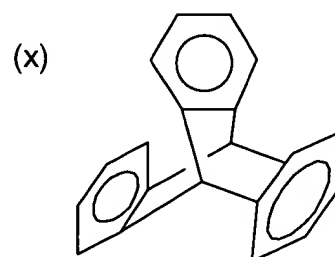
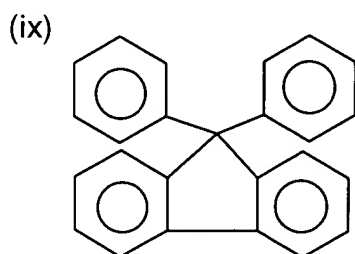
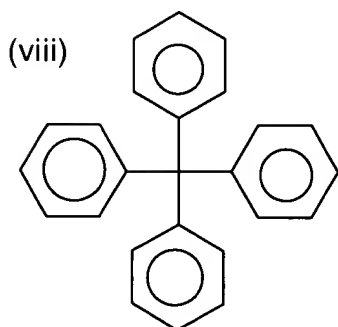
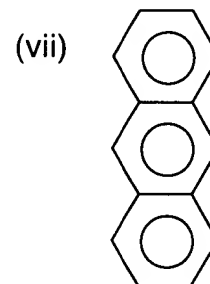
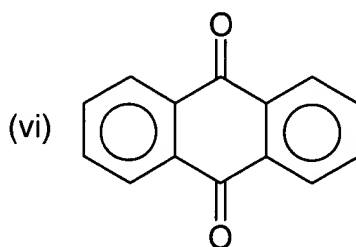
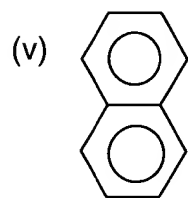
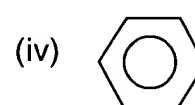
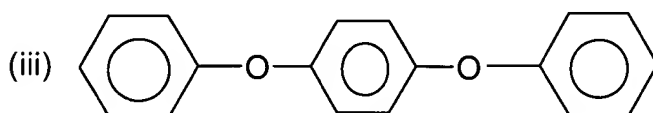
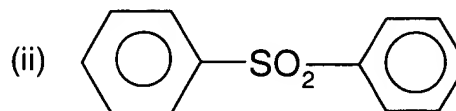
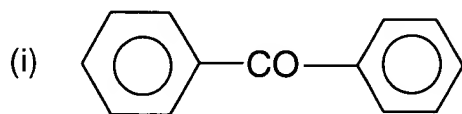
substituted and optionally cross-linked; and wherein m,r,s,t,v,w and z

independently represent zero or a positive integer, E and E' independently

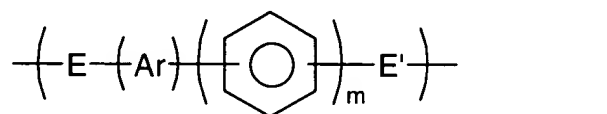
represent an oxygen or a sulphur atom or a direct link, G represents an oxygen or



a sulphur atom, a direct link or a $\cdot\text{O}\cdot\text{Ph}\cdot\text{O}\cdot$ moiety where Ph represents a phenyl group and Ar is selected from one of the following moieties (i) to (x) which is bonded via one or more of its phenyl moieties to adjacent moieties

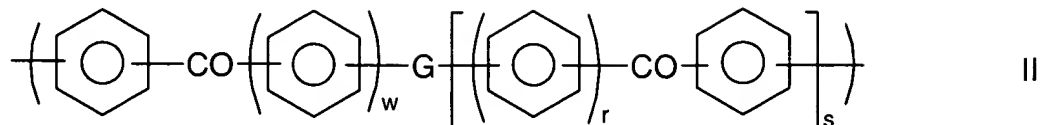


37. (New) A polymer electrolyte membrane which includes a polymer



having a moiety of formula

and/or a moiety of formula



and/or a moiety of formula

wherein at least some of the units I, II, and/or III are functionalised to provide ion exchange sites; wherein the phenyl moieties in units I, II and III are independently optionally substituted and optionally cross-linked; and wherein m, r, s, t, v, w and z independently represent zero or a positive integer, E and E' independently represent an oxygen or a sulphur atom or a direct link, G represents an oxygen or a sulphur atom, a direct link or a -O-Ph-O- moiety where Ph represents a phenyl group and Ar is selected from one of the following moieties (i) to (x) which is bonded via one or more of its phenyl moieties to adjacent moieties

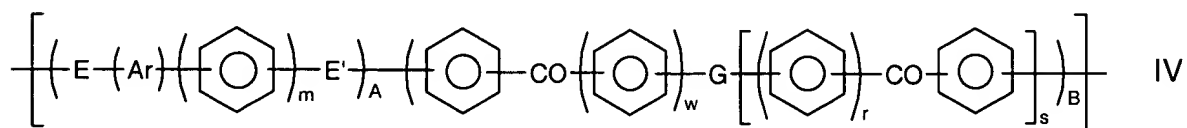
38. (New) A membrane according to claim 36, wherein said polymer is crystalline.

39. (New) A membrane according to claim 36, wherein "a" represents the mole % of units of formula I in said polymer; "b" represents the mole % of

units of formula II in said polymer; and "c" represents the mole % of units of formula III in said polymer and wherein a is in the range 45-100 and the sum of b and c is in the range of 0-55.

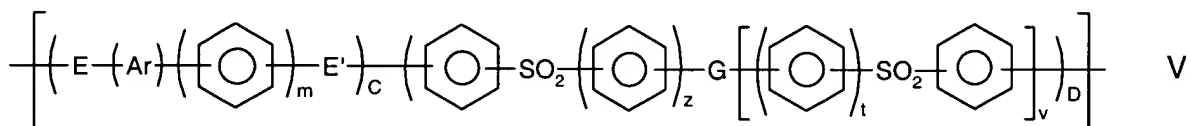
40. (New) A membrane according to claim 36, wherein said polymer consists essentially of moieties I, II and/or III.

41. (New) A membrane according to claim 36, wherein said polymer is a



homopolymer having a repeat unit of general formula

or a homopolymer having a repeat unit of general formula



or a random or block copolymer of at least two different units of IV and/or V

wherein A, B, C and D independently represent 0 or 1.

42. (New) A membrane according to claim 41, wherein said polymer includes at least one repeat unit of formula IV.

43. (New) A membrane according to claim 41, wherein said polymer is a copolymer comprising a first repeat unit of formula IV wherein E and E' represent oxygen atoms, G represents a direct link, Ar represents a moiety of structure (iv), m represents 1, w represents 1, s represents zero, A and B represent 1; and

a second repeat unit of formula V wherein E and E' represent oxygen atoms, Ar represents a structure (i), m represents 0, C represents 1, z represents 1, G represents a direct link, v represents 0 and D represents 1.

44. (New) A membrane according to claim 41, wherein said polymer is a copolymer comprising a first repeat unit of formula IV, wherein E and E' represent oxygen atoms, G represents a direct link, Ar represents a moiety of structure (iv), m represents 1, w represents 1, s represents 0, A and B represent 1.

45. (New) A membrane according to claim 41, wherein said polymer is a copolymer comprising a first repeat unit of formula IV wherein E and E' represent oxygen atoms, G represents a direct link, Ar represents a moiety of structure (iv), m represents 1, w represents 1, s represents 0, A and B represent 1; and a

second repeat unit of formula IV wherein E represents an oxygen atom, E' represents a direct link, Ar represents a moiety of structure (i), m represents zero, A represents 1, B represents 0.

46. A membrane according to claim 41, wherein said polymer is a copolymer comprising a first repeat unit which is either:

(a') of formula IV wherein E and E' represent oxygen atoms, G represents a direct link, Ar represents a moiety of structure (iv), m and s represent zero, w represents 1 and A and B represent 1; or

(b') of formula IV wherein E represents an oxygen atom, E' represents a direct link, Ar represents a moiety of structure (i), m represents zero, A represents 1, B represents zero;

and a second repeat unit which is either:

(c') of formula IV wherein E and E' represent oxygen atoms, G represents a direct link, Ar represents a moiety of structure (iv), m represents 1, w represents 1, s represents zero, A and B represent 1; or

(d') of formula IV wherein E represents an oxygen atom, E' is a direct link, G represents a direct link, Ar represents a moiety of structure (iv), m and s represent zero, w represents 1, A and B represent 1.

47. (New) A membrane according to claim 46, wherein said polymer has a repeat unit as described in paragraph (a') or (b') in combination with a repeat unit as described in paragraph (c').

48. (New) A membrane according to claim 41, comprising a first repeat unit which is selected from the following:

(a) a unit of formula IV wherein E and E' represent oxygen atoms, G represents a direct link, Ar represents a moiety of structure (iv), m and s represent zero, w represents 1 and A and B represent 1;

(b) a unit of formula IV wherein E represents an oxygen atom, E' represents a direct link, Ar represents a moiety of structure (i), m represents zero, A represents 1, B represents zero;

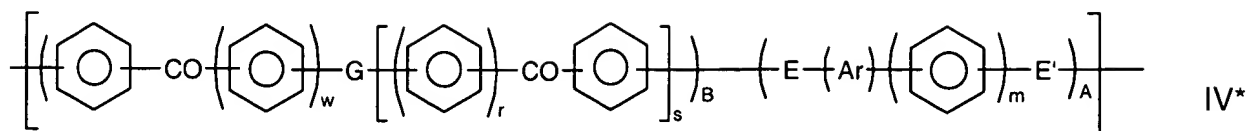
(c) a unit of formula V wherein E and E' represent oxygen atoms, G represents a direct link, Ar represents a moiety of structure (iv), m and v represent zero, z represents 1 and C and D represent 1;

(e) a unit of formula V wherein E and E' represents an oxygen atom, Ar represents a structure (i), m represents 0, C represents 1, Z represents 1, G represents a direct link, v represents 0 and D represents 1;

(f) a unit of formula IV wherein E and E' represent oxygen atoms, G represents a direct link, Ar represents a moiety of structure (iv), m represents 1, w represents 1, s represents zero, A and B represent 1;

(g) a unit of formula IV wherein E represents an oxygen atom, E' is a direct link, G represents a direct link, Ar represents a moiety of structure (iv), m and s represent zero, w represent 1, A and B represent 1;

(h) a unit of formula V wherein E and E' represent oxygen atoms, G represents a direct link, Ar represents a moiety of structure (iv), m represents 1, z represents 1, v represents 0, C and D represent 1; and



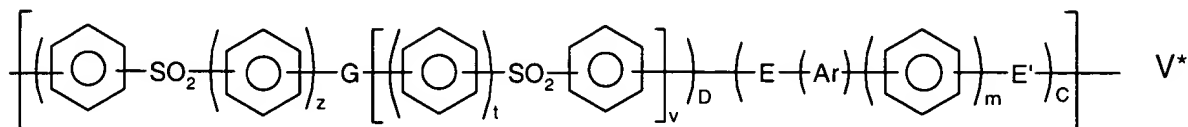
(i) a unit of formula V wherein E represents an oxygen atom, E' represents a direct link, G represents a direct link, Ar represents a moiety of structure (iv), m and v represent zero, z represents 1, C and D represent 1;

49. (New) A membrane according to any of claim 41, wherein said second unit is selected from a unit of formula IV wherein E and E' represent oxygen atoms, G represents a direct link, Ar represents a moiety of structure (v), m represents 0, w represents 1, s represents 0, A and B represent 1; or a unit of formula V wherein E and E' represent oxygen atoms, G represents a direct link, Ar represents a moiety of structure (v), m represents 0, z represents 1, v represents 0, c and d represent 1.

50. (New) A membrane according to claim 48, wherein said copolymer has a first repeat unit selected from units (b), (d) or (e) in combination with a second repeat unit selected from units (f) or (h).

51. (New) A membrane according to claim 36, wherein said polymer is a homopolymer having a repeat unit of general formula

or a homopolymer having a repeat unit of general formula



or a random or block copolymer of at least two different units of IV* and/or V* wherein A, B, C and D independently represent 0 or 1.

52. (New) A membrane according to claim 51, wherein said polymer includes: a repeat unit of formula IV* wherein E represents a direct link, E' represents an oxygen atom, G represents a direct link, w, s and m represent 0, A and B represent 1; and/or a repeat unit of formula V* wherein E represents a direct link, E' represents an oxygen atom, G represents a direct link, z, v and m represent 0, C and D represent 1.

53. (New) A membrane according to claim 52, which includes a repeat unit of formula IV* or V* and any of units (a) to (i) as defined above.

54. (New) A membrane according to claim 36, wherein said polymer includes at least some ketone moieties in the polymeric chain.

55. (New) A membrane according to claim 36, wherein said polymer includes a biphenylene moiety.

56. (New) A membrane according to claim 36, wherein said polymer includes a -O-biphenylene-O- moiety.

57. (New) A membrane according to claim 36, wherein said polymer includes a -O-naphthalene-O-moiety.

58. (New) A membrane according to claim 36, wherein said polymer has a glass transition temperature (T_g) of at least 144°C.

59. (New) A membrane according to claim 58, wherein said glass transition temperature is at least 154°C.

60. (New) A membrane according to claim 36, wherein said polymer has an inherent viscosity of at least 0.3.

61. (New) A membrane according to claim 36, for a fuel cell.

62. (New) A membrane according to claim 36, for an electrolyser.

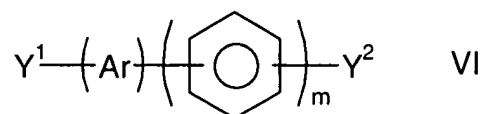
63. (New) A fuel cell incorporating a polymer electrolyte membrane according to claim 36.

64. (New) An electrolyser incorporating a polymer electrolyte membrane according to claim 36.

65. (New) A gas diffusion electrode incorporating a polymer electrolyte membrane according to claim 36.

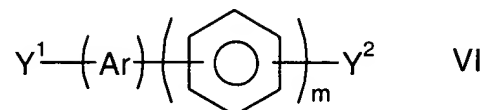
66. (New) A process for the preparation of a polymer as described in claim 36, the process comprising:

(a) polycondensing a compound of general formula

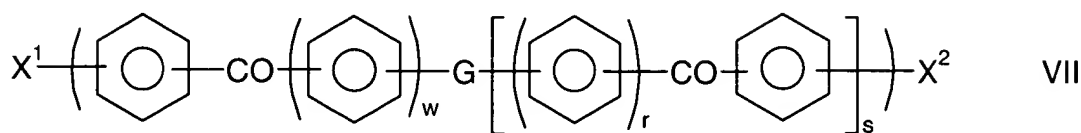


with itself wherein Y^1 represents a halogen atom or a group -EH and Y^2 represents a halogen atom or, if Y^1 represents a halogen atom, Y^2 represents a group E'H; or

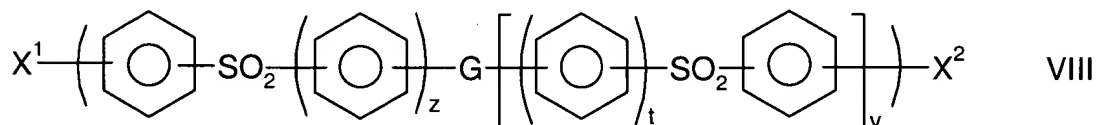
(b) polycondensing a compound of general formula



with a compound of formula



and/or with a compound of formula



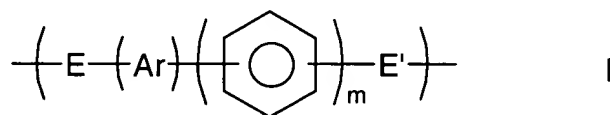
wherein Y^1 represents a halogen atom or a group -EH (or -E'H if appropriate) and Y^2 represents a halogen atom or a group -E'H and X^2 represents the other one of a halogen atom or a group -E'H (or EH of appropriate); and

(c) optionally copolymerizing a product of a process as described in paragraph (a) with a product of a process as described in paragraph (b);

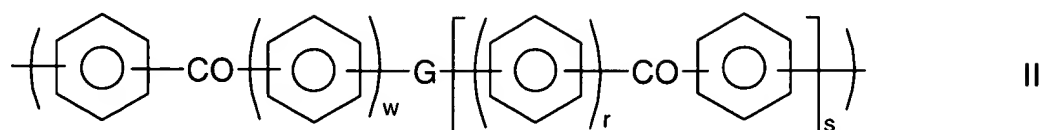
wherein the phenyl moieties of units VI, VII and/or VIII are optionally substituted; the compounds VI, VII and/or VIII are optionally sulphonated; and Ar, m, w, r, s, z, t, v, G, E and E' are as described in claim 36 except that E and E' do not represent a direct link; the process also optionally comprising sulphonating and/or cross-linking a product of the reaction described in paragraphs (a), (b) and/or (c) to prepare said polymer.

67. (New) A process according to claim 66, wherein sulphonation is carried out in concentrated sulphuric acid at an elevated temperature.

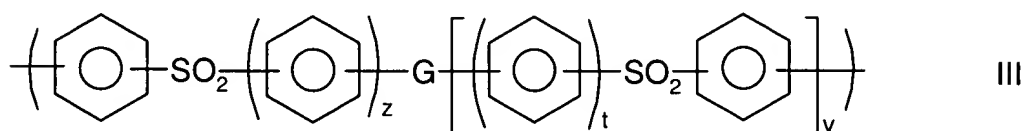
68. (New) A device selected from a fuel cell incorporating a polymer electrolyte membrane, an electrolyser incorporating a polymer electrolyte membrane and a gas diffusion electrode, wherein said polymer electrolyte



membrane or said gas diffusion electrode includes a polymer having a moiety of formula



and/or a moiety of formula



and/or a moiety of formula

wherein at least some of the units I, II, and/or III are sulphonated; wherein the phenyl moieties in units I, II and III are independently optionally substituted and optionally cross-linked; and wherein m,r,s,t,v,w and z independently represent zero or a positive integer, E and E' independently represent an oxygen or a sulphur atom or a direct link, G represents an oxygen or a sulphur atom, a direct link or a -O-Ph-O- moiety where Ph represents a phenyl group and Ar is selected from one of the following moieties (i) to (x) which is bonded via one or more of its phenyl moieties to adjacent moieties, wherein said polymer includes at least some ketone moieties in the polymer chain and wherein said polymer includes a multi-phenylene moiety bonded to two oxygen atoms or a fused ring aromatic moiety bonded to two oxygen atoms.